THE STATUS OF TRUMPETER SWANS IN BRITISH COLUMBIA AND YUKON, SUMMER, 1990

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ABSTRACT

A survey of breeding Trumpeter Swans (Cygnus c. buccinator) was conducted in British Columbia and the Yukon in 1990. Survey routes were similar to those used in the 1985 survey, with the addition of one new route in the Beaver Creek area of the Yukon. A total of 322 adult (white) swans and 125 cygnets was seen. That represents an increas of 87.8% since 1985. Productivity in 1990 was 28.0%. Habitat conditions were good to excellent. Survival appears to be good in spite of difficulties reported on wintering areas in the Wyoming-Montana-Idaho area of the United States.

RÉSUMÉ

Un relevé de Cygne trompette (Cygnus c. buccinator) nicheur a été effectué en 1990 en Colombie-Britannique et dans le Yukon. Les parcours du relevé étaient les même que ceux utilisés pour le relevé de 1985 avec, en plus, un nouveau parcours dans la région de Beaver Creek, au Yukon. Au total, 322 cygnes (blancs) adults et 125 cygnets ont été aperçus. Cela représente une augmentation de 87,7 % depuis 1985. En 1990, la productivité était de 28,0%. Les conditions de l'habitat variaient de bonnes à excellentes. La survie semble bonne en dépit de difficultés signalées dans des aires d'hivernage du Wyoming, du Montana et de l'Idaho, aux États-Unis.

INTRODUCTION

In 1985 the Canadian Wildlife Service assisted with a range wide survey of Trumpeter Swans, in cooperation with the U.S. Fish and Wildlife Service and The Trumpeter Swan Society. The results of the complete North American survey, including captive swans, was reported in an unpublished manuscript of the U.S. Fish and Wildlife Service, Portland. The results of the Canadian portion of the survey were reported in McKelvey et al. (1988). More detailed accounts of regional surveys were reported in McKelvey (1986) for British Columbia and Yukon, Shandruk (1986) for Alberta, and Shandruk and McCormick (1986) for the Northwest Territories.

The intention in 1985 was for Canada to participate in intensive surveys that had been conducted at 5-year intervals in Alaska since about 1970 (King and Conant 1981). The results of the 1990 survey are summarized in this report, for British Columbia and Yukon. Details of survey routes and flying times, numbers of swans seen, locations of swan sightings, and observations on habitat conditions are summarized.

METHODS

Survey routes and flight dates are shown in Tables 1 and 2 respectively, for the Yukon and British Columbia portions of the survey. The general location of the survey routes are shown on small scale maps in Appendix 1. Detailed flight lines are recorded on National Topographic System (NTS) 1:250,000 maps on file in the Whitehorse and Delta offices of the Canadian Wildlife Service. All place names mentioned in the text are shown on those NTS maps.

Routes flown in 1990 included all areas surveyed in 1985, plus some new routes, based on sightings of swans since 1985. Although the coverage appears to be more extensive in 1990, the survey was only expanded in areas where swans were known to have nested since 1985, in the Yukon survey, or in proximity to nesting areas, in British Columbia. The 1990 survey is therefore directly comparable to the 1985 survey, with areas added in 1990 having had no or few birds in them in 1985.

Table 1. Approximate route flown during the 1990 Trumpeter Swan survey, Yukon.

Date	Route
17 August	Burwash - Donjek River - Pickhandle Lakes - Tchawsahmon Lake - Koidern - White River - Enger Lakes - Dry Creek - Beaver Creek (fuel) - Fish Hole Lake - Wellesley Lake - Wolf Lake - Tincup Creek - Redtail Lake - Brooks Arm (Kluane Lake) - Burwash. Distance flown 1100 kms; flying time 6.7 hrs
19 August	Teslin - Nisutlin Bay - Eagle Bay - Morley Bay - Swift Lake - Kachook Creek - Prairie Lake - Callison Ranch - Nahlin River - Zancudo Lake - Hall Lake - Gladys Lake - Fish Lake - Snafu Creek - Little Atlin Lake - Tagish - M'Clintock Bay - Whitehorse (fuel) - M'Clintock Bay - M'Clintock Lakes - Baker Lake - Rosy Lake - Teslin River - Teslin. Distance flown 900 kms; flying time 5.5 hrs
20 August	Teslin - Nisutlin Bay - Nisutlin River - Quiet Lake - Salmon Lake - Nisutlin Lake - Moss Lake - Bruce Lake - Ross River - Weasel Lake - Marjorie Lake - Sheldon Lakes - Itsi Lake - Otter Lake - Fortin Lake - McEvoy Lake (fuel at Finlayson Lake) - McEvoy Creek - Finlayson Lake - Pelly Lakes - Woodside River - McPherson Lake - Tillei Lake - Frances Lake - Tuchitua River - Dodo Lakes - Watson Lake. Distance flown 1350 kms; flying time 8.4 hrs
21 August	Watson Lake - Garden Creek - Blind Lake - Lootz Lake - Spruce Creek - Toobally Lakes - Beaver River - Jackpine Lake - Quartz Lake - Tom Lake - Watson Lake (fuel) - Leo Lake - Lower Post - Egnell Lakes - Hillgren Lakes - Triangle Lakes - Tropical Creek - Larsen Lake - Crow Lakes - Toobally Lake - Siwash Creek - Triangle Lake - Barney Lake - Watson Lake (fuel) - Teslin. Distance flown 1450 kms; flying time 8.9 hrs.

Table 2. Approximate route flown during the 1990 Trumpeter Swan survey, British Columbia.

Date	Route
16 August	Ft. Liard - Sand River - Maxhamish Lake - Emile Creek - Forture Creek - Hissitl Creek - Petitot River - July Lake - Thinahtea Creek - NWT border.
	Distance flown 385 kms; flying time 2 hrs (L. Shandruk)
24 August	Ft. St. John - Boudreau Lakes - Jackfish Lake - Moberly Lake - Peace River - Ft. St. John (fuel) - Chinchaga River - Milligan Hills - Hunter Lake - Beaton River - Ft. St. John.
	Distance flown 900 kms; flying time 4.7 hrs
25 August	Parker Lake - Ft. Nelson River - Clarke Lake - Ellen Lake - Gutah Creek - Tommy Lakes - Klua Lakes - Mile Post 250 - Klowee Lake - Parker Lake (fuel) - Patry Lake - Tsinhia Lake - Tightfit Lake - Trail Lake - Tsea Lake - Komie Lake - Ft. Nelson River - Parker Lake.
	Distance flown 1100 kms; flying time 5.7 hrs
5 September	Dawson Creek - Klukas Lake - Toms Lake - Swan Lake - Peavine Lake - Kelly Lake - Campbell Lake - Sunderman Creek - Blackhawk Lake - Lockhorn Lake - Kiskatinaw River - Bearhole Lake - Hourglass Lake - Kirkland Lake - Sony Lake Rat Lake - South Redwillow River - Hiding Creek.
	Distance flown 775 kms; flying time 4 hrs (L. Shandruk)

Additional routes in the Yukon based portion of the survey included a new route in the Kluane Lake-Beaver Creek area. Coverage in British Columbia was expanded with the inclusion of areas in the Chinchaga River-Milligan Hills area north of Ft. St. John, the Maxhamish Lake-Petitot River area northeast of Ft. Nelson, and increased coverage south of Teslin.

Observations in Yukon were made from a wheel equipped Piper PA18 Super Cub in the west, and a float equipped Maul M7 in the central and eastern areas. In British Columbia a float equipped Cessna 185 and a wheel equipped Cessna 206 were flown out of Ft. Nelson and Ft. St. John, respectively. Flying heights were generally 150 to 300 meters above ground, at speeds between 130

and 210 kilometers per hour. Observations of swans, other waterfowl, and habitat conditions were recorded directly onto NTS 1:250,000 map sheets, supplemented by tape recorded observations as necessary.

RESULTS AND DISCUSSION

Population Status

Yukon. A summary of all the sightings for the Yukon portion of the survey, which includes sightings in British Columbia in the Smith River area, is included in Table 3. In 1985 141 swans, including 22 cygnets in 9 broods were seen in the Yukon. In 1990 271 swans were observed, including 67 cygnets in 22 broods. That represents an increase of 92%. If the Kluane area (which was not surveyed in 1985) is not included, the Yukon total is 200 swans including 44 cygnets in 15 broods, an increas of 42%. An additional 14 swans sighted by other observers in the Yukon are included in Table 3. Productivity (proportion of cygnets in the flock) was 15.6% in 1985 and 24.7% in 1990. In 1990 the most productive flock was that in the Kluane Lake-Beaver Creek area (32.4% cygnets).

The Teslin area once again revealed few swans. Although the area is important in both spring and fall migration (McKelvey and Burton 1983; Johnstone and McEwen 1983), it does not appear it is being colonized by breeding swans. That may indicate that the area is not in fact good swan habitat, or may be a result of the habitat being too far from other swan nesting areas to be colonized readily. Some areas in the Prairie Lake-Callison Ranch area which had good populations of other waterfowl are also close to the local tree line. Heavy snow fall and late springs may cause the breeding season to be too short for the area to be attractive to breeding swans. Extensive surveys in this area in the future would seem to be unwarranted, given the results of the past two surveys.

The swan population in the Kluane Lake-Beaver Creek area is believed to be a recent development. Nesting pairs have been recorded over the years in the Pickhandle Lakes area (McKelvey et al. 1983), and more recently (1988) at Wolf Lake, Fish Hole Lake, Wellesley Lake, northeast of Snag, and between Enger Lakes and the White River (Nixon 1989). Non-breeders were reported on

Kluane Lake in 1985 (B. Conant pers. comm.), and at Aishihik Lake, Lake Creek, and McKinnon Lake near the Donjek River in 1988 (Nixon 1989). However, nothing like the number of birds seen in 1990 was suspected. This flock is adjacent to a substantial population of swans (398 in 1989; Groves et al. [1990]) in the upper Tanana River area near Tetlin, Alaska, and is probably an expansion of that group. That would also make them part of the Pacific Coast Subpopulation, which winter in abundance on the southern British Columbia coast.

Table 3. Results of the 1990 Trumpeter Swan survey in British Columbia and Yukon.

Area	Pairs		Singles		Flocked birds	Subtotal	Cygnets	Total Swans	Effort (hours)
	with broods	without broods	with broods	without broods					
Kluane	6	8		5	15	48	23	71	6.5
Teslin		1		2		4		4	5.5
Itsi	6	13		3	28	69	14	83	8.4
Toobally	9	23	1	6	12	83	30	113	8.9
Other	3			1		7	7	14	inc.
YT Total	24	45	1	17	55	211	74	285	29.3
F S John	8	13		2	17	61	31	92	4.7
Dawson Cr	5	15		2	4	46	21	67	4.0
Ft Nelson	9	11	1	3	13	57	27	84	5.7
Petitot R	2	1			4	10	11	21	2.0
Other	3	3			4	16	14	30	inc.
BC Total	27	43	1	7	42	190	104	294	16.4
Survey Total	51	88	2	24	97	401	178	579	45.7

The Ross River-McEvoy Lake flock has increased nearly two-fold since 1985. All of that increase has been in the northeastern part of the survey area, from the Sheldon Lakes-Itsi Lake area to the McEvoy Lake-Finlayson Lake

area. Few swans were seen south of Ross River, in the area of the Pelly Mountains. Although valley wetlands in this area appear hospitable to waterfowl there are many instances of inverted tree lines, indicating pooling of cold air in valley bottoms. That in turn may delay spring break-up to such an extent that the area is unsuitable for nesting swans. Future surveys in the area around Ross River will also likely be unproductive.

The Toobally Lakes population of swans seems to have recovered from the apparently declining trend seen in 1985. The 1990 count was 55% above that of the 1985 count, and productivity was 26.5%, compared to 16.4% in 1985. One white phased cygnet was observed at Siwash Creek. Generally, more birds were seen in all locations, rather than many new locations being used. Survey coverage was approximately the same as that of 1985 however, new locations which we could not survey may have also been used. Additional breeding and non-breeding swans are known to occur in the MacMillan and Stuart River drainages but those areas could not be surveyed in 1990 due to poor weather.

British Columbia. Swans in the Boudreau Lake area southwest of Ft. St. John have increased dramatically. In 1985 22 birds were seen, including 11 cygnets. In 1990 84 birds were seen in the same area, with 26 cygnets, an increase of 280%. Additional coverage in the Moberly Lake-Cecil Lake-Boundary Lake area revealed an additional 8 adults. Those areas were not specifically surveyed in 1985, although in reconnaissance surveys prior to 1985 they were known not to support swans in summer (pers. obs.). Productivity, in comparable survey areas, was down somewhat in 1990 from 1985, but still quite respectable (31.0% vs. 50.0%).

No swans were located in the Chinchaga River headwaters-Milligan Hills area, in spite of an extensive search and reports of their presence on that drainage in Alberta (L. Shandruk, pers. comm.). Waterfowl in general were very scarce in this area, as were signs of beaver. The area is basically flat with some gentle relief in the Milligan Hills area. The vegetation is predominately stunted spruce, with an almost complete lack of birch or aspen. Water bodies are generally edged with Carex sp. meadows, but other emergents are lacking. Species of pond lily are wide spread and the waters are generally very dark brown. Further surveys in this area are not recommended.

Survey coverage in the Ft. Nelson area was slightly more comprehensive in 1990 than in 1985. Ponds in the Elleh Lake-Fontas-Sikanni Chief River area were surveyed for the first time. On average however, coverage was similar. The total number of swans seen was substantially higher: 84 vs. 20 in 1985, or a 320% increase. Productivity was 32.1%. Two white-phased cygnets were seen in a brood of four on a pond near Tommy Lakes. Klowee Lake again had two broods, this time sighted together at the west end, roosting, within 50 m of each other.

Klowee Lake continues to be probably the most productive lake in the range of Trumpeter Swans in British Columbia and Yukon. What makes this lake so attractive in not clear. Vegetation, as noted from the air, did not appear markedly different from that seen elsewhere. Water quality samples taken in 1981 showed the pH to be 7.0, conductuvity to be 102 mmhos/cm and hardness to be 45.7 mg/l $CaCO_3$ (unpubl. data). In comparison with other lakes in northern B.C. and the southern Yukon those values were all quite low. However, when water samples were taken in that area the temperature on Klowee Lake was 19° C, the highest of any lake sampled. Perhaps, if the lake is quite shallow and the microclimate facile, lake productivity may be more a function of temperature, at least as far as swans are concerned. None the less the area should be considered as special, because of the number of swans seen there. Protective status of some type is recommended.

Trumpeter Swans in British Columbia and Yukon appear to have been very successful since 1985. The population has grown from 238 swans, including 53 cygnets to 447 birds, including 125 cygnets, or an over-all increase of 87.8%. Productivity in 1990 was 28.0%, compared to 22.3% in 1985. All areas showed increases. In spite of harsh winter conditions in the Tri-state area, survival of birds from British Columbia and Yukon appears good.

Habitat Conditions

No measurements of habitat quality were make during this survey. However, from the point of view of the senior author the condition of the habitat was much improved, throughout the survey area, from that seen in 1985. What follows is a very subjective description of water levels and plant growth,

included in the hopes that it may be useful in future surveys. The development of more objective measures of habitat would be useful.

Yukon. Habitat conditions throughout the Yukon survey area appeared to be very good. Teslin Lake was at or below its normal water level, with mudflats beginning to emerge on the Nisutlin River delta. Staging ducks and geese were in evidence everywhere. Carex sp. and Equisetum sp. growth was lush.

Water levels in the Sheldon Lakes to Finlayson Lake area appeared normal and aquatic plant growth was lush. Small flocks of ducks were numerous and geese were seen regularly on sand bars in lake inlets.

Habitat conditions in all of the Toobally Lakes survey area were good. Water levels appeared near normal and all emergent plant growth was good. A small fire had swept through part of the Jackpine Lake area in 1990 but this did not appear to have had much direct effect on the wetlands. All of the Turquoise Lakes had recovered from the lower levels noted in 1985. Barney Lake was also well recharged; both marshes on the south end were inundated and emergent plant growth was good.

British Columbia. Habitat conditions in the Ft. St. John area were good. The Boudreau Lakes were fully charged and wetlands throughout the plateau were abundant. Emergent and other aquatic plant growth was good. Boundary Lake and North Boundary Lake appeared to have recovered from the much reduced levels recorded in and since 1985 (E. Hennan, pers. comm.). The 1990 abundance of water no doubt was the result of the near normal snow pack of the 1989-90 winter and the abundant 1990 spring rains (R. Woods, pers. comm.).

Habitat conditions in the Ft. Nelson area, in areas that supported swans, were also good. Water levels were high and emergent plant growth was abundant. Areas that did not have swans were generally of the muskeg type. Such areas were flat, the vegetation was dominated by stunted spruce, water bodies had few emergents and the water was generally very darkly stained. Although beaver might be present in such areas they were not abundant, and lodges were small and widely scattered.

Beaver were always more abundant and appeared more productive, in terms of lodge size, in areas of closed canopy forest, where birch and aspen stands were well mixed with spruce. The topography in such areas was generally hilly, or at least appeared to be composed of morainal deposits such as eskers and other glacial debris. No doubt such areas are much better drained than the muskeg dominated lowlands. On the basis of relief, distribution of closed canopy, mixed species forest and capability for beaver production, it might be possible to predict fairly accurately what areas are likely to support further expansion to the Trumpeter Swan population. Surveys in areas unlikely to meet those criteria should be omitted in the 1995 effort.

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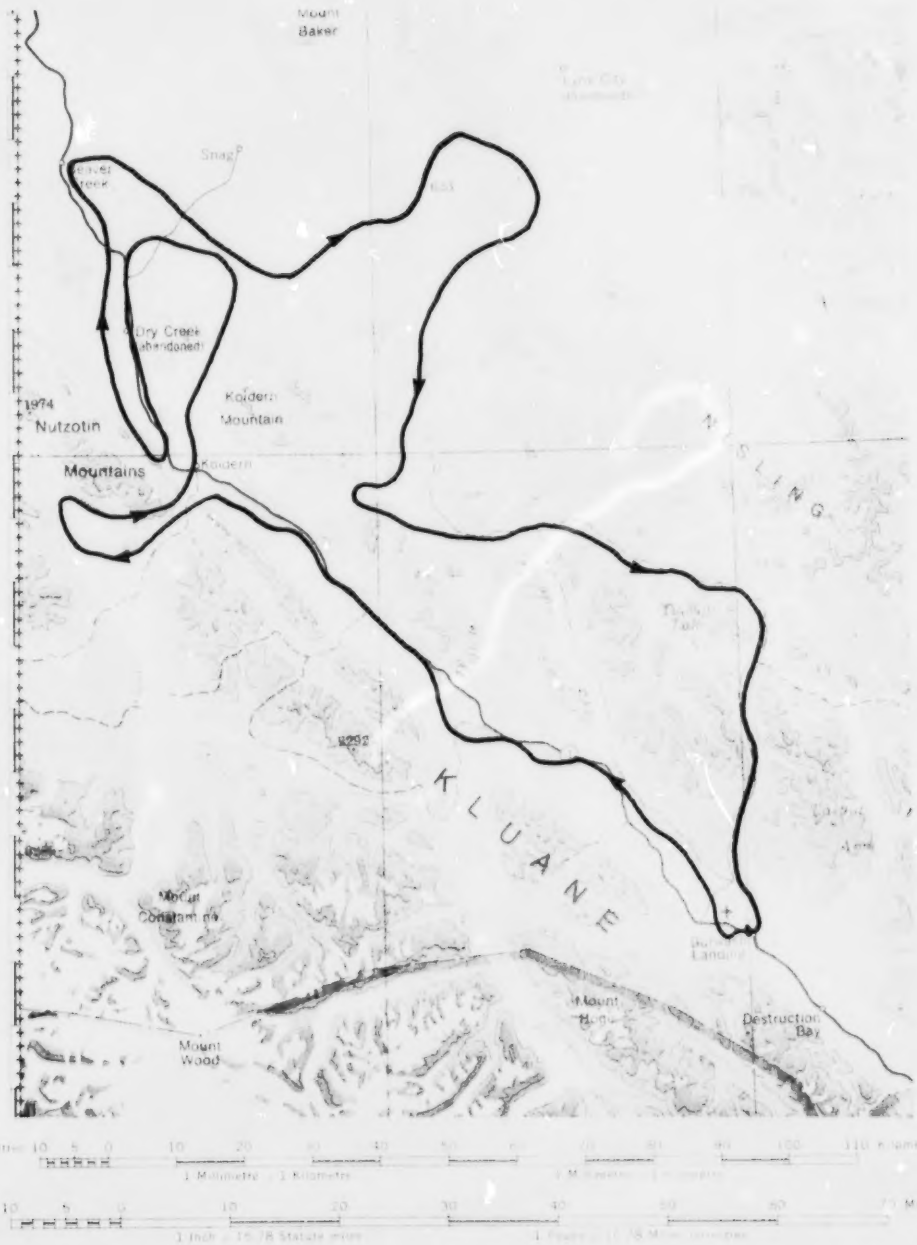
Appendix 1.

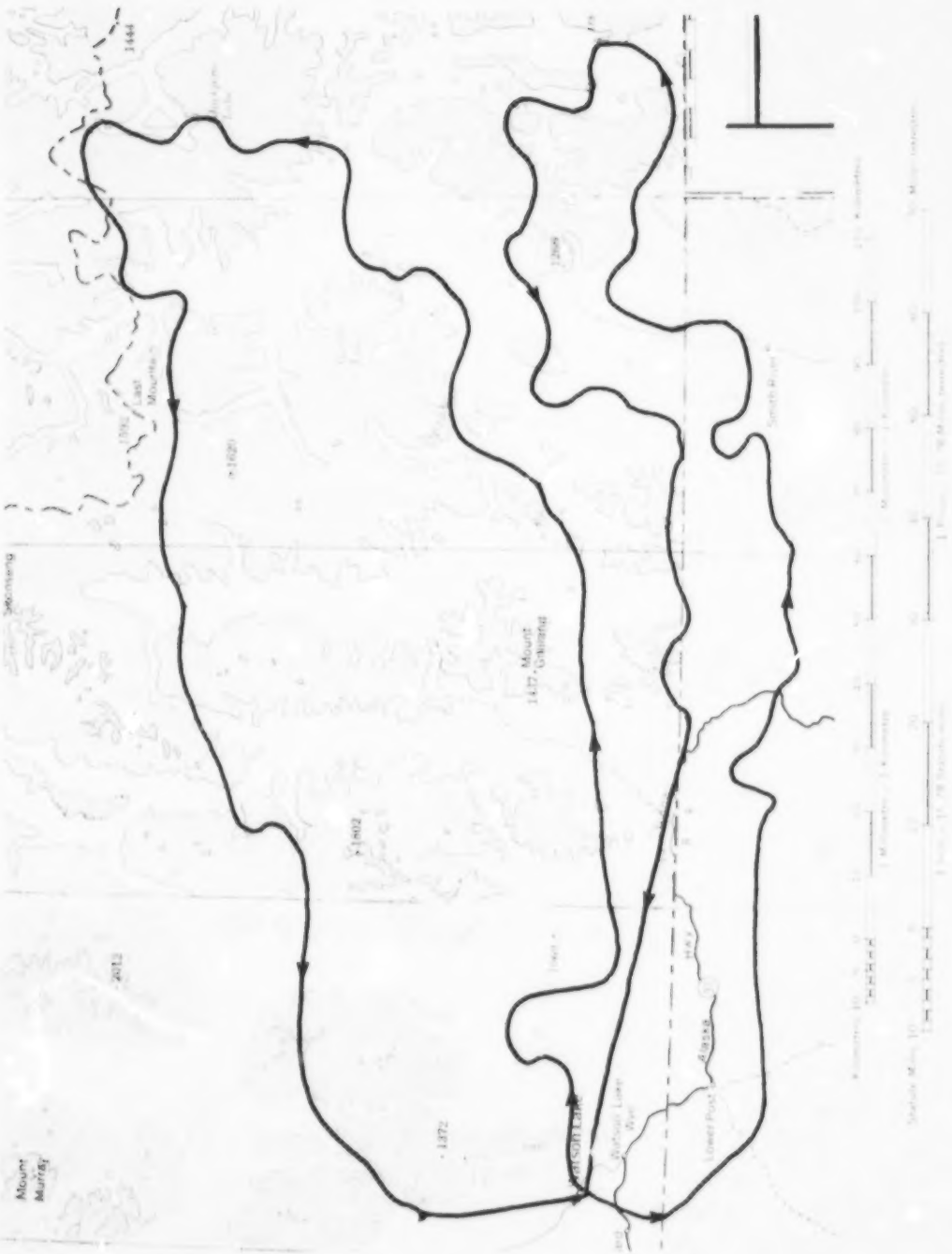
Survey route maps.



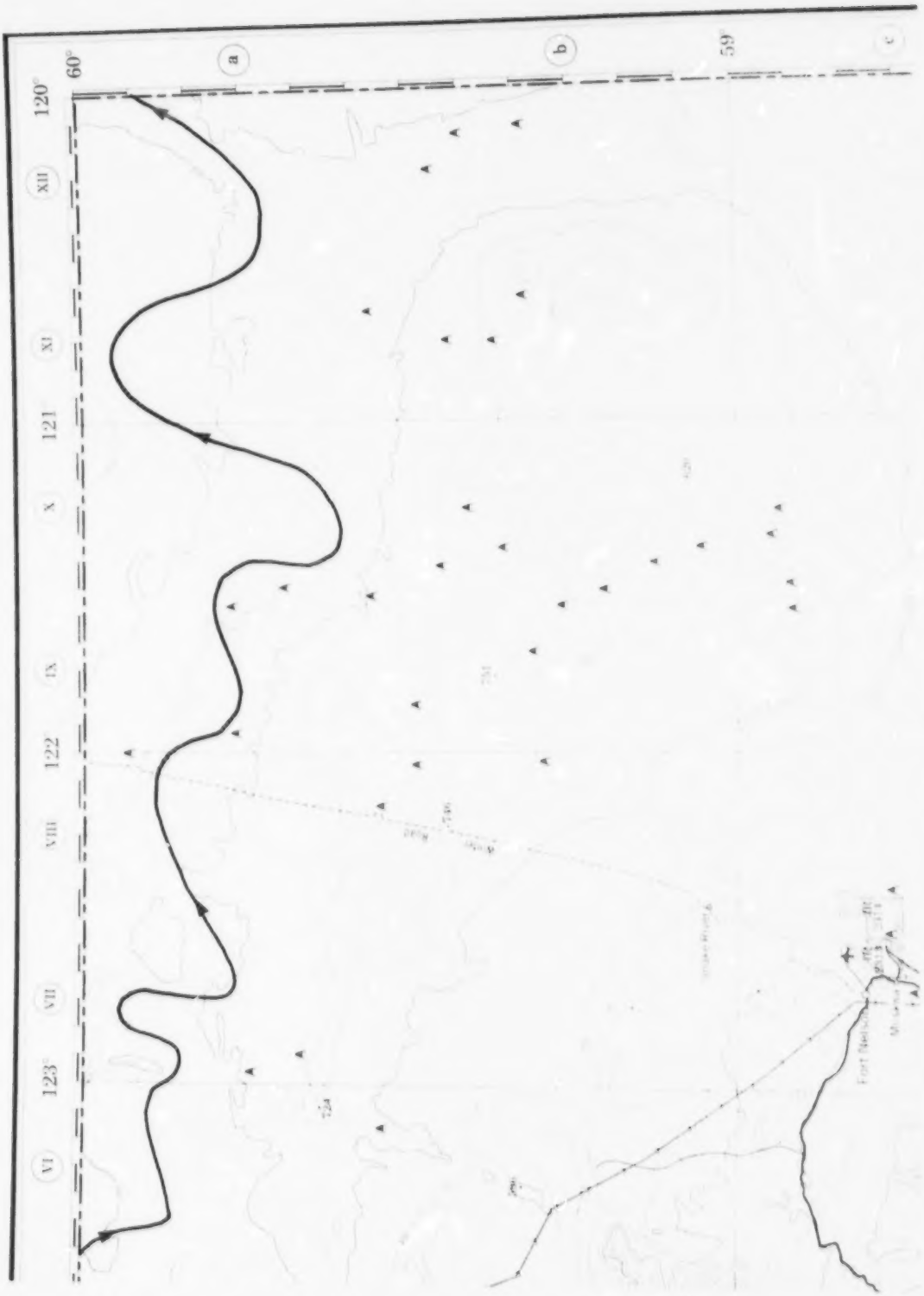
Swan survey route in the Kluane Lake - Beaver Lake area, 17 August, 1990.

Swan survey route west of Teslin, 19 August, 1990.

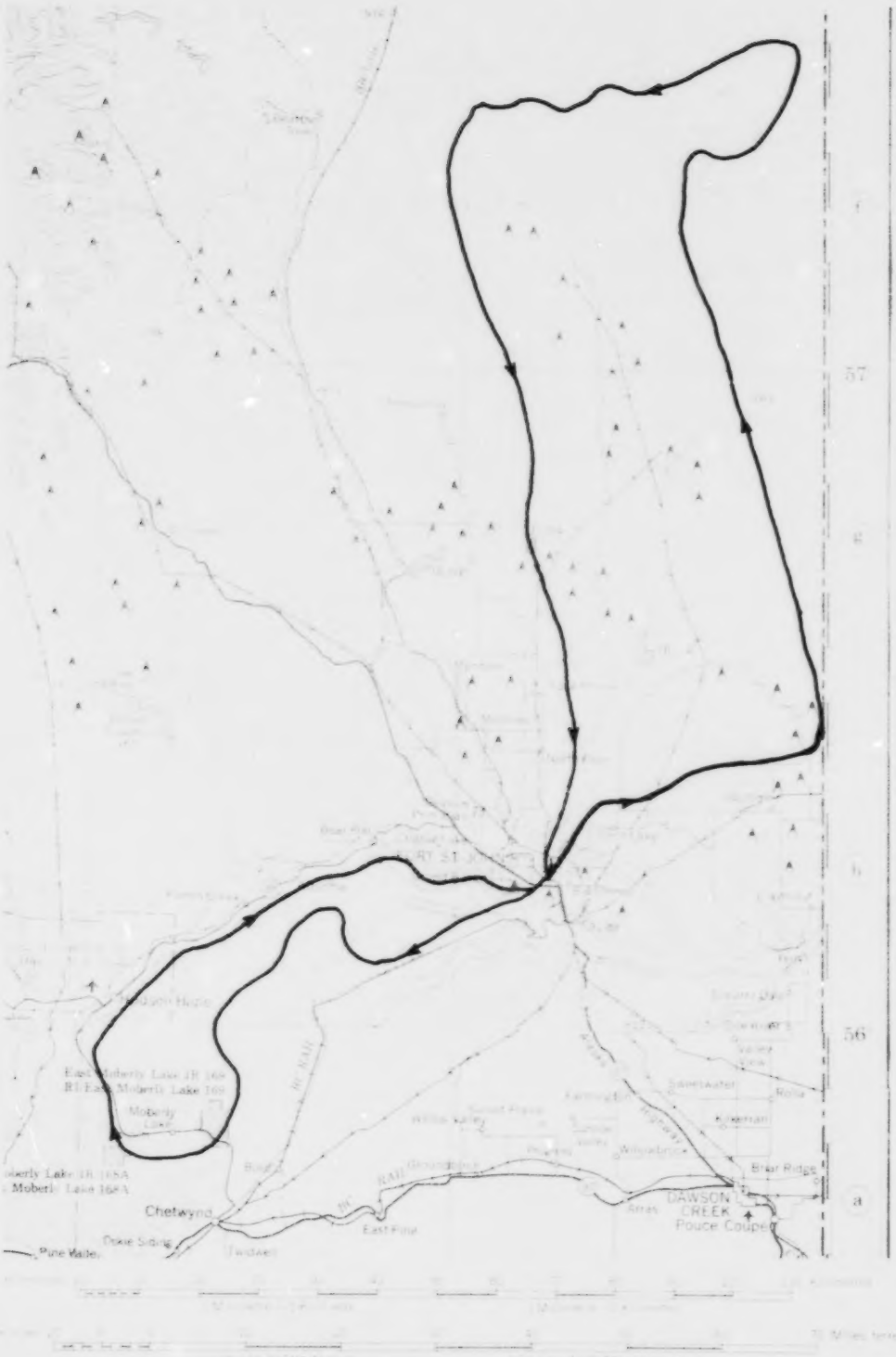
Swan survey route north and east of Teslin, 20 August, 1990.



Swan survey route east of Watson Lake, 21 August, 1990.



Swan survey route in the Petitot River area of BC,
16 August, 1990.



Swan survey route in the Fort St. John area, 24 August, 1990.

Snake River
Steamboat
Fontas
Pouce Coupe River
PEACE RIVER
Kilometres 10 5 0 10 20 30 40 50 60 70 80 90 100 110 Kilometres
1 Millimetre = 1 Kilometre
1 Millimètre = 1 Kilomètre
Statute Miles 10 5 0 10 20 30 40 50 60 70 Miles terrestres
1 Inch = 15.78 Statute miles
1 Pouce = 15.78 Milles terrestres

Swan survey route in the Fort Nelson area, 25 August, 1990.

Swan survey route south of Dawson Creek, 5 September, 1990.

Appendix 2.

Details of each swan sighting.

Table 2-1. Locations and descriptions of each swan sighting in the Yukon portion of the 1990 Trumpeter Swan survey.

Date	Location			Number seen
17 August (Kluane)	Mile Post 1140	pond	61 45 x 140 00	3a
	Pickhandle Lks.	pond	61 56 x 140 25	3a
		pond	61 57 x 140 26	3p
	White River	pond		1p
		pond		2a/4j
		pond	62 15 x 140 28	1p
		pond		2a/5j
	Dry Creek	pond		1p
	Mile Post 1180	pond		2a/3j
	Dry Creek	pond	62 08 x 140 46	1a
	Mile Post 1200	pond		1a
	Fish Hole Lake			2a/5j
	Lake Creek	pond	62 18 x 140 08	5a
	Wellesley Lake			4a
	Donjek River	pond	62 02 x 139 54	1p
		pond	61 57 x 139 55	2a/2j
	Wolf Lake			1a
				1a
				2a/4j
	Donjek River	pond	61 54 x 139 51	1p
	Brooks Creek	pond	61 43 x 138 56	1a
19 August (Teslin)	Hutsigola Lake		59 24 x 132 01	1a
	Prairie Lake	pond	59 02 x 131 38	1p
	North M'Clintock Lake		60 55 x 134 30	1a
20 August (Ross/McEvoy)	Nisutlin River	pond	60 42 x 132 48	1p
		oxbow	60 47 x 132 56	3a
	Lewis Lake			1p
	Field Lake			1p
				3a
	Ross River	pond	62 44 x 130 53	4a
	John Lake	pond	62 47 x 130 30	1p
	Itsi Lake	river	62 49 x 130 20	3a
		lake		3a
	Wilson Lake			2a/2j
	McEvoy Lake	pond	61 46 x 130 19	4a
		pond	61 46 x 130 23	2a/2j
	McEvoy Creek	pond	61 42 x 130 26	2a/2j
	Fortin Creek	pond	61 46 x 130 39	1a
	Woodside River	mouth		1p
		pond	62 12 x 129 59	2a/1j
		pond	62 13 x 129 51	1p

Table 2-1. cont'd.

Date	Location			Number seen
	Narchilla Brook	pond	62 07 x 129 45	2a/1j
		lake	62 07 x 129 49	1p
		lake	62 03 x 129 55	2a/5j
		lake	62 02 x 129 47	1p
		pond	62 04 x 129 44	1p
		pond	61 59 x 129 37	1p
	McPherson River	Yusezyu R.	mouth	1p
	Tillei Lks	pond	61 52 x 129 25	1a
		bay		5a
	Tuchitua River	pond	61 04 x 129 43	2a/2j
		pond	61 03 x 129 43	3a
	Little Jimmy Lake			1p
	Dodo Lakes	lake	60 05 x 129 12	1a
21 August	Garden Creek	pond	60 08 x 128 28	2a/2j
(Toobally)	Lootz Lake			1p
	Lootz Creek	pond	60 13 x 126 47	1a/1j
		creek	60 13 x 126 47	1a
		pond	60 14 x 126 44	1p
	Toobally Lakes	interlake		1p
		interlake		1p
		n. lake s. end		1p
		n. lake n. end		3a
		pond	60 28 x 126 08	1p
	Jackpine Lake	lake 1		1p
		lake 2		1p
		stream	60 45 x 125 47	5a
	Balsam Lake			2a/1j
		lake 12		4a
				2a/5j
	Quartz Lake	lake	60 34 x 127 50	1a
	Little Tom Lake			1p
	Egnell Lakes	lake		1p
		lake		2a/4j
		lake		1p
	Triangle Lakes	lake	59 54 x 126 42	2a/5j
		pond	59 59 x 126 39	1a
	Thorpe Creek	pond	60 02 x 125 30	1p
	Larsen Lake	pond	60 07 x 125 36	2a/4j

Table 2-1. cont'd.

Date	Location		Number seen
	Crow River	pond 60 06 x 125 51	1a
		pond 1	1a
		pond 2	2a/2j
		stream near 6	1p
		stream near 7	1p
		pond 7b	1p
		pond 7c	1p
		pond 7d	1p
		stream near 11	1p
		stream above 9	1p
	Toobally Lakes	lake 60 12 x 126 14	1p
		lake 60 13 x 126 10	1a
	Siwash Creek	pond 60 07 x 126 39	2a/2j
	Barney Lake		2a/4j
	Scoby Creek	pond 60 01 x 127 42	1a

Additional sightings from Yukon.

Source	Location	Number seen
Tetlin NWR staff (Alaska)	15 miles north of Beaver Cr.	1a
Kluane NP	Alder Creek	2a/2j
	Dezadeash River	2a/2j
	Trout Lake	2a/3j

Table 2-2. Locations and descriptions of each swan sighting in the British Columbia portion of the 1990 Trumpeter Swan survey.

Date	Location			Number seen
August 24	Moberly River	marsh	56 11 x 120 58	1p
(Ft. St. John)		marsh	56 08 x 121 01	1p
	Worth	marsh	56 07 x 121 02	2a/5j
		lake	56 07 x 121 08	2a/1j
	Monias Lake			2a/4j
	Boudreau Lakes	lake 2		2a/5j
		lake 6		1p
		near lake 7		1p
		lake 7		2a/3j
		near lake 6b		6a
		near lake 6b		1p
		lake 8a		2a/5j
	Boucher Lake	lake		1p
		pond	56 00 x 121 44	1p
	Rene Lake			2a/5j
	Moberly River	marsh	55 58 x 121 34	1p
	Windy Creek	flying	55 57 x 121 28	8a
		pond	55 58 x 121 27	1p
	Graveyard Creek	pond	55 56 x 121 22	2a/3j
		lake	55 52 x 121 25	3a
	Jackfish Lake	pond	55 48 x 121 30	1p
	Moberly Lake	pond	55 52 x 121 56	1p
	Peace River		56 11 x 121 30	1p
	Cecil Lake			1a
	Boundary Lake	pond	56 22 x 120 00	1a
		pond (Alta)	56 22 x 119 59	1p
25 August	Elleh Creek	pond	58 33 x 122 00	1p
		pond	58 29 x 121 34	1p
	Sikanni Chief R.	pond	58 04 x 121 20	1p
		oxbow	58 04 x 121 30	1p
	Tommy Lakes		57 47 x 121 54	1a
		pond	57 58 x 122 03	1p
		pond	57 59 x 122 10	2a/4j*
	Klua Lakes	east lake	58 10 x 122 08	1p
				4a
				3a
		centre l.	58 07 x 122 15	1p
				1p
				1a/1j
		west lake	58 07 x 122 20	1p
		pond	58 10 x 122 17	1a
	Mile Post 250	pond	58 27 x 122 42	2a/3j
		pond (E7A)	58 23 x 123 00	2a/1j

* two of the cygnets were white-phased.

Table 2-2. cont'd.

Date	Location		Number seen
	Klowee Lake	58 34 x 123 00	1a
			3a
			3a
			2a/2j
			2a/4j
	Milo Lake	58 37 x 123 04	2a/5j
	Muskwa River oxbow	58 47 x 123 00	1p
	Raspberry Creek pond	58 58 x 123 14	2a/3j
	Patry Lake	59 21 x 123 25	1p
	Two Island Lake	59 28 x 122 18	2a/1j
	Komie Lake	59 13 x 122 00	2a/3j

Additional sightings from British Columbia.

Source	Location		Number seen
L. Shandruk	Irene Lake	59 20 x 124 30	1p
			3a
	pond		1a
	July Lake	59 40 x 120 35	1a
			1p
	Thinahtea Lake	59 42 x 120 16	1a
			1a
	Ft. Liard		2a/4j
	pond	54 57 x 120 25	1p
	Denice Lake lake	54 56 x 120 20	2a/3j
	Kirkland Lake lake	54 57 x 120 17	1p
	Gunn Lake lake	54 59 x 120 02	2a/4j
	McWaters Lake lake	55 37 x 120 11	2a/5j
	Klukas Lake lake	55 36 x 120 12	4a
	pond	55 27 x 120 03	1a
	Peavine Lake lake	55 25 x 120 05	1p
	Teepee Lake lake	55 22 x 120 04	1p
	Beaverlodge Lake lake	55 16 x 120 02	1p
	E. Cutbank Lake lake	55 14 x 120 04	1p
	Cutbank Lake lake	55 15 x 120 06	1p
	pond	55 14 x 120 04	1p
	W. Twin Lake lake	55 17 x 120 08	2a/4j
	Foster Lake lake	55 17 x 120 02	1p
	Campbell Lake pond	55 04 x 120 11	1p
	pond	55 04 x 120 11	1a
	Lockhorn Lake lake	55 13 x 120 24	1p

Table 2-2. cont'd.

Source	Location			Number seen
	Blackhawk Lake	lake	55 06 x 120 23	1p
		lake	55 04 x 120 26	1p
	Trout Lake	pond	55 02 x 120 28	2a/5j
		pond		1p
		pond	55 03 x 120 39	1p
B. Conant	Tatshenshini R.	pond	59 31 x 137 24	4a
		pond	59 27 x 137 32	1p
		pond	59 27 x 137 42	2a/5j
	Alsek River	pond	59 28 x 137 44	2a/6j
D. Steventon	Old Man Lake	pond		1p
	Gitnidoix River	pond		2a/3j
	Kalum Lake	lake	(unconfirmed)	1p